1999 Subject/Author Indexes

This index describes the contents of Chemical Engineering Progress, Volume 95, Numbers I through 12. An index of contributing authors begins on page 111.

This subject index is incorporated into the CEP Cumulative Index on AIChE's Web site (http://www.aiche.org/cep/cumindex/) as is the author index (http://www.aiche.org/cep/autindex).

A

Academics, young faculty are satisfied with their careers, Jan. 9

Accreditation Board for Engineering and Technology, new process for evaluating curricula stirs controversy, July 11

Activated carbon adsorbents produced from worn tires, Jan. 15

Advanced Technology Program, FY 2000 R&D funding outlook, Oct. 21 Agency for Toxic Substances and Disease Registry

issues toxicity profiles for priority hazardous substances, Nov. 15 Agglomeration

absorbent stable products, engineering of, Aug. 78

binding mechanisms, Aug. 68 controlled reactivity products, engineering of,

Aug. 79
degradable products, engineering of, Aug. 77
dispersible products, engineering of, Aug. 70
instant products, engineering of, Aug. 70
porous stable products, engineering of, Aug. 78
products from micro- and nanosized particles,

engineering of, Aug. 67 Agitator design for agitated slurry tanks, Nov. 52 AIChE

Member Activity Group, update on initiatives of, Sept. \$12

Student Conferences Dallas, preview of, Sept. S5 Miami Beach Annual, program highlights,

Jan. S1
Regional, summaries of, Sept. S7

Washington Internships for Students of Engineering program, summaries of position papers written by interns, Jan. S6

Air emission releases categories of, Dec. 74 causes of, Dec. 75 prevention of, Dec. 74

prevention of, Dec. 74 strategy for preventing incidents, Dec. 76

Air pollution control air toxics emission rule revised by EPA, Sept. 20

in China, gas-analysis equipment on boilers could improve, Aug. 16

An "S" preceding a page number cites and item in ChAPTER ONE, AIChE's student publication that is bound into CEP issues sent to undergraduates. [Air pollution control] companies find regulations of Clean Air Act Amendments have benefits, Nov. 27

economic incentive programs for states to improve air quality and visibility, draft guidance on released by EPA, Nov. 15

emissions, excess, policy on during malfunction startup, and shutdown reaffirmed and supplemented by EPA, Dec. 25

off-site waste and recovery operations, NESHAP for amended, Sept. 20

smog, software for modeling, Sept. 13 sulfur levels in gasoline may be reduced by EPA, Aug. 20

Title V air operating permit, negotiation of, July 51

Air Quality, book review, Sept. 87 Air toxics

emission rule on revised by EPA, Sept. 20 strategy on released by EPA, Oct. 23 Aircraft fuels, cooling of may improve safety. Dec. 22

Algae, engineered, removes metals from Great Lakes sediments, May 15

Alliant Techsystems sues Thiokol for patent infringement of asbestos-free insulation, Nov. 11

Alloys nickel

applications for, Jan. 65 corrosion resistance of, Jan. 62 nitric acid resistant, May 65 Alloys for

catalytic steam reformers, Feb. 65 ethylene cracking, Feb. 66 fluid-catalytic cracking units, Feb. 65

refineries and petrochemical plants, Feb. 59 Aluminum protected from corrosion by nontoxic coating, Jan. 17

Aniline, new process for developed, Dec. 23
Animal waste, control of nonpoint source pollution
from, Jan. S9

Aqueous solutions, types of reactions in, Oct. 29

Arsenic detected in groundwater by selective sorbent, Dec. 21 Arteries, biomaterials for replacing, May 10

Arteries, biomaterials for replacing, May 10 ASME Boiler and Pressure Vessel Code, guidance on use of stop valves with pressure relief devices, Nov. 58

Avoiding Static Ignition Hazards in Chemical Operations, book review, Dec. 79

В

Bacteria biocatalysis purifies crude oil, May 17 DDT broken down by, June 16

Barricide, fire-resistant gel, Nov. S8 Batch processes modeling of, May 28

preventing pollution in, May 24 Benzene, liquid-phase hydrogenation of modeled, May 14 Best of the Annals of Improbable Research,

book review, Feb. \$3 Bio-informatics beginnings of, Nov. 65

chemical engineers poised to play key role in, Nov. 73 fundamental concepts, Nov. 66

Biodiesel fuel created from vegetable oil by catalytic process, Apr. 17 Biological and chemical weapons neutralized by foam, Apr. 10

Biological information strings, Nov. 67 Biological Treatment of Hazardous Wastes, book review, Apr. 75

for body repair, May 9 for preventing implant rejection, May 10 Biomedicine, engineering of human fissues, Apr. \$1

Bioremediation algae, engineered, removes metals from Great Lakes sediments, May 15 DDT broken down by bacteria, June 16 Biosensor detects aflatoxins, Aug. 13

Boilers, gas-analysis equipment on could improve China's air pollution, Aug. 16 Bone replacement, biomaterials for, May 9 Book reviews

Air Quality, Sept. 87 Avoiding Static Ignition Hazards in Chemical Operations, Dec. 79 Best of the Annals of Improbable Research, Feb. 52

Biological Treatment of Hazardous Wastes, Apr. 75 Catalytic Air Pollution Control Technology,

Nov. 92 Cement and Concrete, Jan. 68 Chemical Exposure and Toxic Response, Mar. 73

Chemicals and Long-Term Economic Growth-Insights from the Chemical Industry, Feb. 79

Clathrate Hydrates of Natural Gases, May 72 Computer Simulations in Compact Heat Exchangers, Mar. 74

Concurrent Engineering Effectiveness: Integrating Product Development Across Organizations, Dec. 79 Contract Engineering: Start and Build a New

Career, Nov. 91
Diffusion: Mass Transfer in Fluid Systems,
June 81

Distillation: Principles and Practices, Mar. 73

Engineering Fluid Dynamics: An Interdisciplinary Approach, July 82 Engineering of Chemical Reactions, Nov. 91 Environmental Assessment of Products:

Prironmental Assessment of Products: Volume 1–Methodology, Tools, and Case Studies in Product Development, May 73

Environmental Electrochemistry: Fundamentals and Applications in Pollution Abatement, Sept. 88 [Books] Environmental Encyclopedia and Directory, June 81

Environmental Impact Assessment: A Practical Guide, Jan. 67 Environmental Ion Exchange: Principles and

Design, June 80 Gaskets and Gasketed Joints, Apr. 73 Guidelines for Pressure Relief and Effluent

Handling Systems, Aug. 92 Handbook of Batch Process Design, July 81

Handbook of Cathodic Corrosion Protection, June 80

Handbook of Environmental Analysis: Chemical Pollutants in Air, Water, Soil, and Solid Wastes, July 82

Handbook of Environmental Fate and Exposure Data for Organic Chemicals: Solvents 3, Volume V, Apr. 73 Handbook of Materials Selection for Engineering Applications, Oct. 77 Heat Exchanger Design Handbook, Aug. 91

Aug. 91 Industrial Gases in Petrochemical Processing, Feb. 80

Processing, reo. 80
Inorganic Chemistry: An Industrial and
Environmental Perspective, Jan. 67
Introduction to Composite Products: Design,
Development and Manufacture,
Sept. 87

Sept. 87 Introduction to Theoretical and Computational Fluid Dynamics, Sept. 88

Petroleum Chemistry and Refining. Apr. 73

Powder Mixing, Mar. 77 Principles of Food Processing, Nov. 92 Profit Center in Industrial Ecology: The Business Executive's Approach to the Environment, Dec. 80

The Race: The Uncensored Story of How America Beat Russia to the Moon, Nov. S3

Risk Assessment in the Process Industries, Jan. 67

Safety Is a People Business: A Practical Guide to the Human Side of Safety. May 72

Scientific Unit Conversion, Mar. 73 Ship of Gold in the Deep Blue Sea. Dec. S7

Thermal Data for Natural and Synthetic Fuels, Dec. 81

Time Out: Using Visible Pull Systems to Drive Process Improvement, Apr. 75 Topics in Environmental and Safety Aspects

of Combustion Technology, Aug. 93 Ultra-Fine Particles: Exploratory Science and Technology, Mar. 76 Visual Explanations: Images and Quantities.

Evidence and Narrative, Oct. 79 Water Vapor Measurement: Methods and Instrumentation, July 83

What Went Wrong?: Case Histories of Process Plant Disasters, Oct. 77 Why Things Are & Why Things Aren't, Mar. S8

FY2000, proposal for reducing greenhouse gases receives chilly reception on Capitol Hill, Apr. 21

FY2000, R&D, funding prospects vary for different programs, Oct. 21 R&D, legislation encourages doubling of

over next 11 years, July 19 Bulk solids processing systems, technique for comparing developed, Aug. 16 Business

environmental challenges viewed as opportunities rather than as profit-draining annoyances by multi-national companies, study finds, July 14

environmental issues, coping with in emerging markets, June 69

C

Calcium oxalate and calcite, aggregation and growth rates of modeled, Nov. 23 Calorimetry for controlling process thermal

hazards, Sept. 71 Cancer cells destroyed by radioactive isotopes chemically dissolved in glass microspheres, May 15

Carbon isotope analysis for monitoring biodegradation of groundwater contaminants, May 16

Career quotient quiz reveals how well one's professional life is being managed, Jan. 93

Careers, advice on for recent graduates, Oct. S6, Sept. S1

Case-based expert systems for control of wastewater treatment plant, June 39

for troubleshooting and controlling plants get foothold in CPI. Apr. 9 Catalysts

electric fields used to create, Aug. 16 zeolites for "greening" of process technology, June 52 Catalytic Air Pollution Control Technology.

book review, Nov. 92 Catalytic steam reformers, alloys for, Feb. 65 Cathodic protection

anode arrangements and placement strategies, June 59 electrochemical background, June 55

galvanic systems, June 57 impressed-current systems, June 58 Cellulose wound-care dressing promotes

healing, June 21 Cement and Concrete, book review, Jan. 68 Ceramic membranes, See Membranes Ceramics

created by robotics without molding or machining, Apr. 17 manufacturing technique for eliminates small

manufacturing technique for eliminates sma diameter that can pose health hazard, May 16 hemical and biological wavesters assert in A

Chemical and biological weapons neutralized by foam, Apr. 10 Chemical engineering

in extraterrestrial environments, Feb. 45 surveys on future of

career management, Oct. 105 computer-related developments, Oct. 102 corporate practices, Oct. 105 disruptive technologies, Oct. 111 economic forces, Oct. 104

education, Oct. 110 environmental factors, Oct. 103 factors affecting, Oct. 52 information and computer technologies,

Oct. S3 medicine, Oct. S4 questionnaire, Apr. 104 results, Oct. 102, Oct. S5

results, Oct. 102, Oct. S5
safety and the environment, Oct. S3
technological developments, Oct. 107
work, how it may change, Oct. S2

Chemical engineers alternative careers, four biographies, Dec. \$1 [Chemical engineers] contributions of to U.S space program, Apr. S6

overseas assignments are viewed favorably.

Dec. 13

Chemical Exposure and Toxic Response, book

review, Mar. 73 Chemical information strings, Nov. 66 Chemical Manufacturers Association introduces Web site with industry production

duces Web site with industry production, and health and safety data, Sept. 12 Chemical process industries seen ready to handle Y2K computer problems, Nov. 25 Chemical Security Act of 1999 addresses threat

of chemical attack on industrial facilities, Sept. 12 Chemicals and Long-Term Economic

Growth-Insights from the Chemical Industry, book review, Feb. 79 China's air pollution could be improved by adding gas-analysis equipment to boilers,

Aug. 16 Chlorides and nonoxidzing acids, superaustenitic stainless steels for combating. Apr. 63

Citric acid cleans polluted soil, Feb. 17 Clathrate Hydrates of Natural Gases, book review, May 72 Clean Air Act

air toxics emission rule revised by EPA, Sept. 20

parametric monitoring for plant permit compliance, Mar. 33 Title V air operating permit, negotiation of,

Title V air operating permit, negotiation of, July 51 Clean Air Act Amendments, companies find

regulations have benefits, Nov. 27 Clean coal technology for minimizing global warming, Jan. S8

Clean Water Act, standards proposed by EPA for wastewater discharges from centralized waste treatment, Mar. 24 Cleaning of equipment and parts, preventing

Cleaning of equipment and parts, preventing pollution in, May 30 Climatic warming

budget proposal for reducing greenhouse gases receives chilly reception on Capitol Hill, Apr. 21 engineering a non-carbon response to global

warming, Jan. S6 sustainable development issue will be dominated by, Jan. 60

Coatings for aluminum protects it from corrosion and is nontoxic, Jan. 17

high-velocity oxygen thermal spray to be developed, June 18 VOCs not emitted by, July 18, Nov. S5

Cold sterilization process for purifying liquid foods, Oct. 17 Colloid mills for high-shear mixing, Nov. 40

Combinatorial problems, software based on Mixed Integer Linear Programming for solving, Aug. 43 Combustion, gasless, modeled, Dec. 18

Combustion, gasless. modeled, Dec. 18 Communication, listening skills, Nov. S6 Companies find Clean Air Act Amendments have benefits, Nov. 27

Compliance Assurance Monitoring regulation of EPA, Feb. 67

Composites, shaped fiber boosts strength of, Feb. 14

Computer Simulations in Compact Heat Exchangers, book review, Mar. 74 Computers, case-based expert systems for troubleshooting and controlling plants get foothold in CPI, Apr. 9 Concurrent Engineering Effectiveness: Integrating Product Development Across Organizations, book review, Dec. 79 Conferences and lectures on the Internet,

Feb. 13 Confined space regulations amended by OSHA, Jan. 22

Congress, tax cuts and Social Security reform top agenda, Feb. 19 Contact lens creator Otto Wichterle dies at 84,

Apr. S5
Contactors (See Gas/liquid contactors)
Contract Engineering: Start and Build a New

Contract Engineering: Start and Build a New Career, book review, Nov. 91 Control systems

case-based expert systems for control of complex processes, June 39 for troubleshooting and controlling plants get foothold in CPI, Apr. 9 plantwide, procedure for synthesis of developed, June 16

cathodic protection for tanks and vessels, June 55

high-temperature mechanisms carburization, Feb. 62 halogen induced, Feb. 64 nitridation, Feb. 64 oxidation, Feb. 61 sulfidation, Feb. 62 under insulation, combating O

under insulation, combating, Oct. 43 stainless steels, superaustenitic, for combating, Apr. 63 in wastewater treatment plants, stainless

steels for combating, July 59
Credible Evidence Regulation of EPA, Feb. 67
Critical incident recorders for hazardous
processes, July 75

Cross-cultural differences career management, July 109 communication, July 107 continuing education, July 109 hierarchy of corporate departments, July 108 hiring process, July 109 information sharing and distribution, July 108

networking, July 109 patent protection, July 108 performance feedback and appraisal, July 109

standards and measurement systems, July 108 Curriculum, chemical engineering green engineering (environmentally conscious design and commercialization)

in, Sept. S14 microelectronics programs, Dec. S1

D

Database, pollutant monitoring aided by, Dec. 21 Databases, incident

for fires and explosions analysis, case study, Oct 65 for gas explosions analysis, case study,

Oct. 65 for hazard chemicals analysis, case study.

Oct. 65 for reactive releases analysis, case study, Oct. 63

DDT broken down by bacteria, June 16 Debottlenecking of plants, low-cost opportunities for, Mar. 25

Department of Energy, FY2000 R&D funding prospects, Oct. 21 Desalination of water evaporators for, Sept. 48 mechanical vapor compression for, Sept. 48 multistage flash process for, Sept. 45 production trends, Sept. 43 thermal vapor compression for, Sept. 50

Diesels may be powered by dimethyl ether. Dec. 22 Diffusion: Mass Transfer in Fluid Systems. book review, June 81

Dilution for odor control, Nov. 81 Dimethyl ether may power diesels, Dec. 22 Dingle, Nicole, profile of, Dec. S6 Dispersion and flow modeled in porous media, Sept. 13

Dissociation in aqueous electrolyte systems, Oct. 29

Distillation: Principles and Practices, book review, Mar. 73 Distillation trays

functional zones, Jan. 23 high capacity deck devices for, Jan. 30 downcomers degassing aids for, installation of, Jan. 33

elimination of, Jan. 32 hanging, how they work, Jan. 27 hanging, increasing cross-sectional area with, Jan. 26

dynamic seals for, Jan. 28 valves, directional and shielded, for, Jan. 30 Distributors, liquid

drip-point layout of, Oct. 58 inspection guidelines, Oct. 60 for packed towers, detecting defects in, Oct. 57 water testing of, Oct. 59

water testing of, Oct. 59
DNA, background on, Nov. 65
Downcomers, hanging, for distillation trays,
Jan. 26
Dust explosions, prevention of, June 25

E

Earth Day '99, suggestions for observing, Mar. S4 Education

accreditation process changes stir controversy, July 11 faculty, young, find careers satisfying, Jan. 9

faculty, young, find careers satisfying, Jan. 9 fellowships offered by Dept. of Defense and Dept. of Energy, Dec. \$5

green engineering (environmentally conscious design and commercialization) in chemical engineering curriculum, Sept. S14

Master of Engineering degree programs, Feb. S4

MBA degree application process, Jan. S12 financial considerations, Jan. S12 Graduate Management Admission Test, Jan. S12

programs, part-time vs. full-time, Jan. S12 microelectronics programs for chemical engineering students, Nov. S1 minority enrollment of freshman increases,

Sept. 13
MIT Japan program, experience of a ChE,

scholarships for chemical engineering students, Nov. S8 teamwork, teaching of via interdisciplinary

Electrolyte systems, simulation of, Oct. 25 Emergency Planning and Community Right to Know Act of 1986, guidance documents for issued by EPA, Aug. 19

Employment alternative careers for ChEs, four biographies, Dec. S1

overseas assignments are viewed favorably by ChEs. Dec. 13

Employment, searching for advice for recent graduates, Oct. S6, Sept. S1 career planning guidelines, Aug. 23 graduates face welcoming job market, June 13

letter writing recommendations, May 101 network your way to a new job, May 99 researching a prospective employer, Aug. 30 sample interview questions, Aug. 31 thank-you letters, tips on writing, Jan. S14 web sites, Aug. 32

Energy transfer/conversion energy management, should it be outsourced?, Apr. 35

equations, design, effective use of for plants, Oct. 69 fluid beds, control of waste feeds in, May 59

Henry's Law and Raoult's Law choosing between, Jan. 51 similarities between, Jan. 49

jacketed vessels, thermal design of, June 61 oxidation/reduction potential for monitoring power-generation water systems, Aug. 61

solar pans, design of, July 65 steam tables, improved methods for calculating, Nov. 45 Engineering and construction industry, sugges-

tions for stabilizing, Sept. 56 Engineering Fluid Dynamics: An Interdisciplinary Approach, book review, July 82

Engineering of Chemical Reactions, book review, Nov. 91

Environmental Assessment of Products: Volume 1-Methodology, Tools, and Case Studies in Product Development, book review, May 73

Environmental challenges viewed as opportunities rather than as profit-draining annoy ances by multi-national companies, study finds, July 14

Environmental Electrochemistry Fundamentals and Applications in Pollution Abatement, book review, Sept. 88

Environmental Encyclopedia and Directory, book review, June 81 Environmental, health, and safety issues in product development, Sept. 84

risk mapping to maximize corporate value, Dec. 63 Environmental Impact Assessment: A Practical Guide, book review, Jan. 67

Environmental industry, U.S. government report questions focus of, Feb. 18 Environmental Ion Exchange: Principles and

Design, book review, June 80 Environmental policy and regulation, next gen-eration of, Jan. 58

Environmental protection air emission releases, prevention of, Dec. 74 air operating permit, negotiation of, July 51 and business ventures in emerging markets, June 69

Compliance Assurance Monitoring regulation of EPA, Feb. 67

Credible Evidence Regulation of EPA, Feb. 67

[Environmental protection]

Kyoto Protocol on greenhouse gases unlikely to be ratified by Congress this year, Dec. 24

odor control, dilution for, Nov. 81 parametric monitoring for Clean Air Act plant permit compliance, Mar. 33 pollution prevention in multiproduct plants,

heuristics for, Apr. 53 product development, role of environmental, health and safety issues in,

Sept. 84 thermal desorption for site remediation, basics of, Oct. 49

wastewater systems and process hazards, Aug. 53 Environmental Protection Agency

air operating permit, negotiation of, July 51 air quality and visibility, economic incentive programs for states to improve, draft guidance on released, Nov. 15

air toxics emission rule revised, Sept. 20

deadline for "seven-year maximum achievable control technology" permit extended, July 21

Emergency Planning and Community Right to Know Act of 1986, guidance documents for issued, Aug. 19 emissions

excess, policy on during malfunctions startup, and shutdown reaffirmed and supplemented, Dec. 25

fugitive, definition of interpreted as it applies to VOCs, Apr. 22 FY2000 R&D funding prospects.

Oct. 21 gasoline, sulfur levels in may be reduced, Aug. 20

generic maximum achievable control technology standards finalized, July 21 Integrated Urban Air Toxics Strategy

released, Oct. 23 off-site waste and recovery operations NESHAP for amended, Sept. 20 Risk Management Program

fuels threshold to be raised, June 22 regulations of modified, Feb. 21 submission form finalized. Apr. 22 stormwater regulations expanded,

Dec. 25 t-butyl acetate may be excluded as VOC, Nov. 15

toxic pollutants, draft list of 53, targeted for source reduction, Jan. 22

Yellow Book: Guide to Environmental Enforcement and Compliance at Federal Facilities reissued, Nov. 15 Y2K testing policy published to ensure environmental compliance is not impaired,

May 20 Environmental Technologies Design Option Tool, software for determining best site remediation method, Oct. 20

Equipment and parts cleaning, preventing pollution in, May 30

Ethylene

cracking of, alloys for, Feb. 66 new process for beats steam cracking route, Sept. 15

Expert systems, case-based, for troubleshooting process plants, Apr. 57 Expert testimony by engineers, standards for clarified by Supreme Court, May 19 Explosions, dust, prevention of, June 25

Explosives detected underwater by sensor, Dec. 23

Facility siting, risk-based approach, May 51 Fault trees for plant safety, spreadsheets can facilitate use of, Apr. 69

Federal Research Investment Act of 1999 encourages doubling of U.S. R&D budget, July 19

Fellowships offered by Dept, of Defense and Dept, of Energy, Dec. S5 Films, thin, can be analyzed by laser test,

Apr. 19 Filters

capacity of, June 75 efficiency of, June 75 medium selection, June 73 ermeability defined, June 74

Filters, high-efficiency media may lower operating efficiency, Sept. 16

Fire detection and suppression systems Halon replacement agents, Aug. 37 heat detectors, Aug. 36 HFC-23, Aug. 40 HFC-227ea, Aug. 39 smoke detectors, Aug. 37

Fire-resistant gel, Barricide, Nov. S8 Fireproofing for structures and equipment supports, Nov. 75

Flow and dispersion modeled in porous media, Sept. 13 Fluid beds, control of waste feeds in, May 59

Fluid-catalytic cracking units, alloys for, Feb. 65 Fluids/solids handling agglomeration for making products from micro- and nanosized particles, Aug. 67

filter medium selection, June 73 pumps, centrifugal, predicting efficiency for, Jan. 37

pumps, improving performance of, May 35 tanks, agitated slurry, design of, Nov. 51 two-phase flows during releases, determination of, Feb. 55

valves, control, sizing and selection of, Mar. 45

Food safety bacteriologic enzymes destroy pathogens, Aug. 9

biosensor detects aflatoxins, Aug. 13 electronic nose detects ripeness of fruit, Aug. 15

high-pressure technology for, Aug. 9 irradiation virtually ignored, Aug. 11 meat protected by lactic acid and microwave treatment, Aug. 10

pulsed electric field technology for, Aug. 10 sensor detects pathogens, Dec. 20 tags tracks freshness through color changes, Aug. 13

Foods, liquid, cold sterilization process for purifying, Oct. 17

Fruit, ripeness of detected by electronic nose, Aug. 15 Fuel cells

applications in chemical process industries,

for automotive engines, Mar. 62 commercialization of, obstacles to, Mar. 64 features of, Mar. 63 new markets for, Mar. 65 a power source for developing countries?,

Mar. 59 types of, Mar. 59 Fuels, aircraft, cooling of may improve safety,

Dec. 22 Fugitive emissions, definition of interpreted by EPA as it applies to VOCs, Apr. 22

G

Gas/liquid contactors columns, bubble features of, July 23 mass-transfer coefficient, July 36 scale-up of, July 45 columns, packed features of, July 24 mass-transfer coefficient, July 41 columns, plate/tray, features of, July 25 ejectors, tubular/venturi, features of, July 25 flow regimes of, July 32 gas sparger design, July 49

heat exchangers, scale-up of, July 47 mixers, motionless, features of, July 25 pipes/tubes features of, July 23 mass-transfer coefficient, July 43 and pressure drop, July 35

reactors, jet (loop), features of, July 25 selection guidelines, July 25 tanks, mechanically agitated features of, July 24 mass-transfer coefficient, July 39

Scale-up of, July 47
Gas turbines, strategies to cut refurbishment costs

coatings should be properly applied and removed, Dec. 40 dimensional and system integrity shouldn't

be overlooked, Dec. 39 inspection and repairs should be handled

individually, Dec. 37 reengineer when necessary, Dec. 39 smooth out the cold section for hot section savings, Dec. 40

testing, sacrificial and nondestructive, should be combined, Dec. 38 use one vendor, Dec. 37

video borescope inspections, Dec. 38 Gaskets and Gasketed Joints, book review, Apr. 73

Gasless combustion modeled, Dec. 18 Gasoline additives, evolutionary technique for selecting, Nov. 20

Gasoline, EPA proposes reducing sulfur levels in, Aug. 20 Genes and their functions, discovery of,

Nov. 71 Genome projects, Nov. 70 Glass microspheres with radioactive isotopes

destroy cancer cells, May 15 Glass, tempered, process for makes it stronger and less variable, Apr. 19

Global warning clean coal technology for minimizing. Jan. S8

engineering a non-carbon response to, Jan. S6 sustainable development will be dominated

by, Jan. 60 Graduate Management Admission Test for an MBA degree, Jan. S12

Graduates face welcoming job market, June 13

Green engineering (environmentally conscious design and commercialization) in chemical engineering curriculum, Sept. S14 Greenhouse gas protocol unlikely to be ratified

by Congress this year, Dec. 24 Groundwater, biodegradation of contaminants monitored by carbon isotope analysis, May 16

Groundwater, contaminated, software for sampling and monitoring, Sept. 13 Guidelines for Pressure Relief and Effluent Handling Systems, book review, Aug. 92

Н

Handbook of Batch Process Design, book review, July 81

Handbook of Cathodic Corrosion Protection, book review, June 80 Handbook of Environmental Analysis: Chemical Pollutants in Air, Water, Soil,

and Solid Wastes, book review, July 82
Handbook of Environmental Fate and Exposure
Data for Organic Chemicals: Solvents 3,
Volume V. book review, Apr. 73

Handbook of Materials Selection for Engineering Applications, book review, Oct. 77

Heat Exchanger Design Handbook, book review, Aug. 91

Heat transfer pinch technology network design using. Dec. 30 problem decomposition applied to aromatics solvent plant, Dec. 31

problems with, Dec. 28 Henry's Law constants

constants
concentration units, conversion of, Jan. 52
pressure units, conversion of, Jan. 52
for solubility of ethane w. methane, Jan. 55
for solubility of methane in water, Jan. 55
sources of, Jan. 51
'typical' value for, Jan. 53
'typical' value for, Jan. 53

"typical" value for, Jan. 53 units for, Jan. 52 and Raoult's Law, similarities between,

Jan. 49 Horizon articles chemical engineering in extraterrestrial env

chemical engineering in extraterrestrial environments, Feb. 45 fuel cells, developing countries may adopt as power source, Mar. 59

power source, Mar. 59 hydrodynamic cavitation improves reactions, May 43 water desalination technology, Sept. 43

zeolites, properties of and environmental applications for, June 47 Hydrochloric acid, process for upgrading.

Nov. 25

Hydrodynamic cavitation improves reactions,

May 43 Hydrogen sulfur recovered by MISHA process,

Jan. 16 synthetic enzyme may reduce production costs, Nov. 27

ı

Ignition energy, minimum, of dust, June 29 Ignition temperature, minimum, of dust, June 29

Implant rejection, biomaterials for preventing, May 10

Incinerators, fluid-bed, control of waste feeds in, May 59 Industrial Gases in Petrochemical Processing,

book review, Feb. 80 Inorganic Chemistry: An Industrial and Environmental Perspective, book review, Jan. 67

Instrumentation, critical incident recorders for hazardous processes, July 75 Instrumented systems, safety, safeguarding of, Nov. 85

Insulation combating corrosion under, Oct. 43 low- and high-temperature types.

Oct. 44 system design guidelines, Oct. 45 Insulation, asbestos-free, Thiokol sued by Alliant Techsystems for patent infringement, Nov. 11

Interdisciplinary projects, teaching teamwork via, Feb. S1

Internet

Chemical Manufacturers Association introduces site with industry production, and health and safety data, Sept. 12 conferences and lectures, Feb. 13

on-line publications, Feb. 11 risk management plans' worst case scenarios barred from Web, Sept. 9

Risk Management Program of EPA, resources for, Feb. 73

Internships, Washington Internships for Students of Engineering program, summaries of position papers written by interns, Jan. So Introduction to Composite Products: Design,

Development and Manufacture, book review, Sept. 87 Introduction to Theoretical and Computational Fluid Dynamics, book review, Sept. 88

Fluid Dynamics, book review, Sept. 88 Ionic liquid, supercritical carbon dioxide used to separate it from hazardous chemicals, June 21

JKL

Japan Program of MIT, experience of a ChE, Mar. S6

Jobs, See Employment, searching for Kyoto Protocol on greenhouse gases unlikely to be ratified by Congress this year, Dec. 24

Lasers, semiconductor, may replace light emitting diodes, Feb. 17

Lecturers and conferences on the Internet. Feb. 13

Legislation Chemical Security Act of 1999 addresses threat of chemical attack on industrial

facilities, Sept. 12 Emergency Planning and Community Right to Know Act of 1986, guidance documents for issued by EPA, Aug. 19

Federal Research Investment Act of 1999 encourages doubling of U.S. R&D budget, July 19

on pensions remains probable, Nov. 13 Research and Experimentation Tax Credit will probably be extended, June 24 Superfund reform uncertain this year, Sept. 19

Liquid membrane for removing metals from waste streams, Nov. 17 Listening skills, Nov. S6

M

Management environmental issues in emerging markets, coping with, June 69 process development tools, Feb. 31 project execution, gu/delines on, Mar. 100 Maple mathematics software, July 69

Mars chemical engineering on, Feb. 45 mining its atmosphere for materials, Feb. 48 for metals and oxygen, Feb. 51 for water, Feb. 51 Mass spectrometer, sensitivity of improved by electrodynamic ion funnel, July 17 Master of Engineering degree programs, Feb. S4 Materials alloys for refineries and petrochemical plants, Feb. 59 alloys that resist nitric acid, May 65 cathodic protection of tanks and vessels, June 55 chlorinated polyvinyl chloride piping, Aug. 49 coatings that do not emit VOCs, Nov. \$5 corrosion under insulation, combating, Oct. 43 fire-resistant gel, Nov. S8 fireproofing for structures and equipment supports, Nov. 75 hazardous, updated toxicological profiles issued, Nov. 15 metals, porous, may be used in superfast computers or for catalyzing chemical reactions, Nov. 23 nanotubes are both rigid and elastic. Apr. 16 nickel alloys applications for, Jan. 65 corrosion resistance of, Jan. 62 Sept. 79

plastics for construction, hazards of, plastics recycling aided by froth flotation,

Aug. 16 polyester strengthened by liquid crystalline polymer, July 14 polymer molecules, motion of as they are

being stretched can be detected by new probe, Oct. 20 for pump construction, May 35 stainless steels

for combating corrosion in wastewater treatment plants, July 59 superaustenitic, for combating chlorides and nonoxidizing acids, Apr. 63

supply chain analysis method to cut expenses analysis, Dec. 68 auditing, Dec. 69 cylinder gases, Dec. 71 goal-setting and benchmarking, Dec. 70 implementation, Dec. 69 information gathering, Dec. 67 laboratory supplies, Dec. 72 office supplies, Dec. 72

prioritization, Dec. 68 storeroom operation, Dec. 71 tire repair, Dec. 73

toilet paper and liquid soap, Dec. 73 superconducting, magnetic-field patterns found at point current is carried without resistance, Jan. 14

altrasound reveals defects in, Jan. 16 for wet air oxidation, Mar. 51 Mathcad mathematics software, July 70 Mathematica software, July 70

Mathematics, design equations, effective use of for plants, Oct. 69 Matlab mathematics software, July 72 MBA degree

application process, Jan. S12 financial considerations, Jan. S12 Graduate Management Admission Test, Jan. S12 programs, part-time vs. full-time, Jan. S12 combinatorial problems, techniques for solving, Aug. 43

Measurement and control

expert systems, case-based, for troubleshooting process plants, Apr. 57 pharmaceutical pilot plant safety.

Mar. 39 process control, case-based system for, June 39

safety instrumented systems safeguarding of, Nov. 85 certain installations exempted from standards for, May 39 six sigma, quality control programs based on,

Sept. 65 Meat contamination prevented by lactic acid and microwave treatment, Aug. 10

Membranes ceramic

hollow-fiber, Oct. 14 for producing industrial feedstock, Oct. 13

for producing synthesis gas, Oct, 11 for wastewater cleanup, Oct, 14 liquid, for removing metals for waste streams, Nov. 17

polymeric, under development for non-aque-ous processing applications. Jan. 17 for purifying drinking water inspected by

sound waves for fouling. Dec. 21 stainless steel for filtration and separation

systems, Oct. 16 Metal-containing waste, market for treatment of grows, Nov. 29

Metals, porous, may be used in superfast computers or for catalyzing chemical reactions, Nov. 23

Metals removal from waste streams adsorbent for, Nov. 18 ion exchange technology for, Nov. 18 liquid membrane technology for, Nov. 17

vacuum distillation for, Nov. 17 Methane reactions, role of oxygen and product removal in modeled, Apr. 10

Microchips for releasing chemicals, Apr. S7 underfill for attaching them to circuit cardunder development, July 14

Microelectronics programs for chemical engi-neering students, Nov. S1

Microscope, near-infrared raman imaging, for analyzing materials is thousands of times faster than current methods, Oct. 19

Minorities, enrollment of freshmen increases, Sept. 13 MIT Japan Program, experience of a ChE,

Mar. S6 Mixed Integer Linear Programming for solving combinatorial problems, Aug. 43 Mixers, high-shear

colloid mills, Nov. 40 devices and applications, Nov. 33 homogenizers, Nov. 37 pipeline mixers, Nov. 38 Modeling of batch processes, May 28

Models of binary adsorption in silicalite, Oct. 16 of calcite and calcium oxalate, aggregation and growth rates, Nov. 23

of ethylene glycol distillation column, Jan. 13 of flow and dispersion in porous media,

Sept. 13 of gasless combustion, Dec. 18 [Modelcl.] for liquid-phase benzene hydrogenation, May 14

of methane reactions, role of oxygen and product removal in, Apr. 10

for quantifying impact of control implementation inaccuracies on open-loop control policies, July 13

thermodynamic, used in phase equilibrium calculations for an electrolyte system, Oct. 27

for ultrafine-particle size growth and

distribution, July 15 Molecules, biological, analysis of automated by porous silicon and mass spectrometry. July 16 Monitoring

carbon isotope analysis for monitoring biodegradation of groundwater contaminants, May 16 parametric, for Clean Air Act permit compliance, Mar. 33 of pollutants by database, Dec. 21

of process and control equipment, Feb. 68

N

Nanochannels, new pumping method for, Feb. 13

Nanoshells offer promise of new coatings and sensors, June 18 Nanotubes are both rigid and elastic.

Apr. 16 Natural gas, converted to synthesis gas by ceramic membranes, Oct. 11 Near-critical water may replace organic

solvents, Dec. 18 Nerve gas detected by new sensor, Feb. 15

NESHAP (National Emission Standards for Hazardous Air Pollutants) for magnetic tape manufacturing amended, June 22

for off-site waste and recovery operations amended, Sept. 20 for phosphate issued, June 22

for polyurethane foam due, Jan 22 Network your way to a new job, May 99 Nickel alloys applications for, Jan. 65

corrosion resistance of, Jan. 62 Nitrate waste converted into nitrogen gas by nonthermal, nonbiological process, Feb. 15

Nitric acid alloys that resist, May 65 applications for, May 68

North American Industrial Classification System replaces Standard Industrial Classification System, Feb. 74

Nuclear power plants can sue governn for failing to accept spent fuel, Jan. 21

Nuclear waste, plan for burying it at Yucca Mountain, NV, Jan. 21

0

Occupational Safety and Health Administration confined space regulations amended, Jan. 22

employers must pay for employee's personal Odor control, dilution for, Nov. 81

Oil, crude, purified by bacteria biocatalysts, May 17

Overseas assignments are viewed favorably by ChEs. Dec. 13

Oxidation/reduction potential for monitoring power-generation water systems, Aug. 61

Oxygen separation sparks new ceramic membranes, Oct. 11

Paclitaxel, a chemotherapeutic, processs for producing, July 16

Parametric monitoring for Clean Air Act plant permit compliance, Mar. 33 Particle counter, optical, detects airborne

contaminants, Aug. 13 Particles, ultrafine, size growth and distribution of modeled, July 15

Parts and equipment cleaning, preventing pollution in, May 30

Patent law claims, how they are narrowed from their literal wording, Apr. 23

development contracts and the critical date. Nov. 11 infringement in which one product overlaps several patents, Jan. 19

infringement involving pharmaceuticals, Aug. 21

insulation, asbestos-free, Thiokol sued by Alliant Techsystems for patent infringement, Nov. 11

Patent Cooperation Treaty, background and procedures of, June 23 Pathogens in food detected by sensor, Dec. 20

Pecan shells treated to become activated charcoal filters for removing heavy metals from wastewater, Apr. 12 Peer review of chemical processes to insure

safety, Jan. 41 Pension legislation remains probable, Nov. 13

Petroleum Chemistry and Refining, book review, Apr. 73

Pharmaceutical processes, new approach to development of, Aug. 82 Pharmaceuticals and patent law infringement,

Aug. 21 Photonic chips for computers, new silicon film may be precursor for, Oct. 19

Pilot plants pharmaceutical, safety procedures for, Mar. 39

as a process design tool, Feb. 39 Pinch technology problem decomposition applied to aromatics solvent plant, Dec. 31 problems with, Dec. 28

Pipeline mixers for high-shear mixing.

Piping of chlorinated polyvinyl chloride design guidelines, Aug. 51 installation and testing of, Aug. 51 joints for, Aug. 52

vs. other polymers, Aug. 50 solvent welding of, Aug. 52 Plants

control systems for, procedure for synthesis of developed, June 16 debottlenecking of, low-cost opportunities for, Mar. 25

expert systems, case-based, for troubleshooting and control of, Apr. 9, Apr. 57

(Plants)

fault trees for safety in, spreadsheets can facilitate use of, Apr. 69 petrochemical, and refineries, alloys for,

Feb. 59 pollution prevention in, heuristics for,

Apr. 53 wastewater treatment, combating corrosion in with stainless steels. July 59

Plastics recycling aided by froth flotation, Aug. 16 via plasma process, Oct. 17

Plastics used as materials of construction. hazards of, Sept. 79

Pollution control air toxics strategy released by EPA, Oct. 23

algae, engineered, removes metals from Great Lakes sediments, May 15 animal waste, control of nonpoint source pol-

lution from, Jan. S9 arsenic detected in groundwater by selective sorbent, Dec. 21

citric acid cleans polluted soil, Feb. 17 metal-containing wastes, market for treatment of grows, Nov. 29 metals removal from waste streams, tech-nologies for, Nov. 17

in plants, heuristics for, Apr. 53 software for groundwater sampling and

monitoring, Sept. 13 software for identifying best site remediation method, Oct. 21

toxic pollutants, 53, targeted for source reduction by EPA, Jan. 22 Pollution prevention

air quality and visibility, economic incentive programs for states to improve, draft guidance on released by EPA. Nov. 15

in batch processes, May 24 database aids pollution monitoring, Dec. 21 in equipment and parts cleaning. May 30 for reactors, May 25

soil pollution potential predicted by method. June 20 Polyester strengthened by liquid crystalline

polymer, July 14
Polymer molecules, motion of as they are being stretched can be detected by new probe, Oct. 20

Polymer processes, modeling of, Apr. 39 Polyurethane foam, NESHAP for due, Jan. 22 Powder flowability, determination of to maximize plant output, Apr. 25

Powder Mixing, book review, Mar. 77 Pressure relief devices, isolation of during maintenance or testing, Nov. 57, Nov. 60

Principles of Food Processing, book review, Nov. 92

Process control, case-based systems for, Apr. 9, June 39 Process development

management tools for aggregate planning, Feb. 33 quality function deployment, Feb. 33 pilot plants as process design tool, Feb. 39 research and development, allocation of resources, Feb. 27

tips on turning an idea into a commercial process, Feb. 24

Process Safety Management programs of OSHA and Risk Management Program of EPA, differences between, Feb. 72 Processes

adsorbent technology for removing metals from waste streams, Nov. 18

[Processes]

modeling of, May 28

preventing pollution in, May 24 chemical, peer review of to insure safety.

Jan. 41

citric acid cleans polluted soil, Feb. 16 cold sterilization for purifying liquid foods, Oct. 17

control of via case-based systems, Apr. 9, June 39 for converting solid and liquid nitrate wastes

into nitrogen gas, Feb. 15 for ethylene beats steam cracking

Sept. 15 hazardous, critical incident recorders for, July 75

hydrogen recovered by MISHA process. Jan. 16

ion exchange, for removing metals from waste streams, Nov. 18

liquid membrane for removing metals from waste streams, Nov. 17 for metals removal from waste streams, Nov. 17

monitoring of, Feb. 69 plasma, for plastics recycling, Oct. 17 sulfur recovered by MISHA process,

Jan. 16 thermal hazards of, calorimetry for controlling, Sept. 71

vacuum distillation, for removing metals from waste streams, Nov. 1 vegetable oil turned into biodiesel fuel by

catalytic process, Apr. 17 Product development, role of environmental. health, safety issues in, Sept. 84

Professional development career quotient quiz reveals how well one's work life is being managed. Jan. 93

cross-cultural differences, making the most of, July 107

listening, guidelines on, Nov. S6 network your way to a new job, May 99 Professors, careers are satisfying to young faculty, Jan. 9

Profit Center in Industrial Ecology: The Business Executive's Approach to the Environment, book review, Dec. 80 Project management

guidelines on execution of engineering, procurement, and construction projects, Mar. 100

ten rules for, Mar. 103 Publications on the Internet, Feb. 11 Pumping method for nanochannels, Feb. 13

centrifugal, predicting efficiency for, Jan. 37

materials of construction to resist abrasives, chemicals, and harsh environments.

QR

Quality control, six sigma programs, Sept. 65 The Race: The Uncensored Story of How America Beat Russia to the Moon, Nov. S3

Raoult's Law and Henry's Law, similarities between, Jan. 49 Reactions and separations

distributors, liquid, for packed towers, detecting defects in, Oct. 57

[Reactions and separations] pharmaceutical processes, new approach to development of, Aug. 82 polymer processes, modeling of, Apr. 39

reverse osmosis, process control for, Sept. 57

solvents, screening of for organic solids, Dec. 41

Reactors, pollution prevention strategies for, May 25 Recorders, critical incident, for hazardous

processes, July 75 Recycling of plastics aided by froth flotation.

Aug. 16 Regulations

Compliance Assurance Monitoring regulation of EPA, Feb. 67 on confined spaces amended by OSHA,

Jan. 22 Credible Evidence Regulation of EPA. Feb. 67

employers must pay for employee's personal protective equipment, OSHA rules, June 22

environmental, ranking of worldwide, June 70

generic maximum achievable control technology standards finalized by EPA, July 21

magnetic tape manufacturing NESHAP amended, June 22 phosphate NESHAP issued by EPA.

June 22 on pressure relief device isolation,

Nov. 58 Risk Management Program threshold for

fuels to be raised. June 22 seven-year maximum achievable control technology" permit deadline extended by EPA, July 21

Research and development FY2000 R&D funding prospects vary for dif-ferent programs, Oct. 21

measuring economic return of, Feb. 28 process, reasons for investing in, Feb. 29

reward researchers fairly, Feb. 29 role of in process development, Feb. 27 U.S. budget for may double over next 11 years, July 19 Research and Experimentation Tax Credit set

to expire. June 24 Reverse osmosis systems, process control for,

Sept. 57 Riddle, Kathryn, profile of, Dec. S6 Rinker, Kristina, profile of, Nov. S4

Risk Assessment in the Process Industries, book review, Jan. 67 Risk-based approach to facility siting.

May 51 Risk management plans' worst case scenarios barred from Web, Sept. 9 Risk Management Program of EPA Risk man

action plan for meeting June 21 deadline,

disclosure requirements, Feb. 71 facilities affected by, Feb. 72

fuels threshold to be raised, June 22 and Process Safety Management programs of OSHA, differences between, Feb. 72 regulations of modified, Feb. 21

bmission form finalized, Apr. 22 Risk mapping to maximize corporate value, Dec. 63

Robotics create precise ceramics without molding or machining, Apr. 17

Safety

calorimetry for controlling process thermal hazards, Sept. 71

of chemical processes, peer review for, Jan 41 critical incident recorders for hazardous

processes, July 75 databases for managing incident reports,

Oct. 62 dust explosions, prevention of, June 25 facility siting, risk-based approach,

May 51 fault trees for plants, spreadsheets can facili-tate use of, Apr. 69

fire detection and suppression systems. Aug. 35

fireproofing for structures and equipment supports, Nov. 75 hazard analyses, audits, and inspections. resolving conflicts among. Mar. 67

of pharmaceutical pilot plants, Mar. 39 plastics used as materials of construction. hazards of, Sept. 79

pressure relief devices, isolation of during maintenance or testing, Nov. 57, Nov. 60

risk management plans' worst case scenarios barred from Web, Sept. 9 Risk Management Program deadline of EPA,

action plan for, Feb. 71 risk mapping to maximize corporate value, Dec. 63

risk matrix, evaluation criteria for, Mar. 68

wastewater systems and process hazards, Aug. 53

Safety instrumented systems new standard for exempts certain installations from some provisions. May 39

afeguarding, Nov. 86 Safety Is a People Business: A Practical Guide to the Human Side of Safety, book review, May 72

Scholarships for chemical engineering students, Nov. S8 Scientific Unit Conversion, book review.

Mar. 73 Seals, dynamic, for distillation trays, Jan. 28

Semiconductor chips "grown" from silicon, Sept. 13 Sensors

bioluminescent bacteria detect pollutants, June 20 explosives detected underwater by,

Dec. 23 for monitoring radioactive wastes offers

three modes of selectivity, Oct. 19 for nerve gas, Feb. 15

pathogens in food detected by, Dec. 20 Polychromator detects gases two miles away, Sept. 16 Shear, types and magnitudes of, Nov. 36 Ship of Gold in the Deep Blue Sea, book

review, Dec. S7 Silicate, binary adsorption in modeled,Oct. 16 Silicon film may be precursor for photonic chips for computers, Oct. 19 Silicon, porous, combined with mass spectrom-

etry to automate analysis of biological molecules, July 16

Simulation of electrolyte systems, Oct. 25 Simulators, process, advantages and disadvantages of, Mar. \$2

Six sigma, quality control programs based on, Sept. 65

Sludges, mill, serve as barrier slurry walls, July 15 Slurries

agitators for, Sept. 35 instrumentation. on-line, for, Sept. 31

measurement of properties, Sept. 22 pipeline specifications, Sept. 26 pipelines, cleaning of, Sept. 31 pumps for, Sept. 31

storage tanks for, Sept. 31 valves for, Sept. 31 Smog, software for modeling, Sept. 13

Environmental Technologies Design Option Tool for identifying best site remedia-tion method, Oct. 20

for modeling smog, Sept. 13 for sampling and monitoring of contaminated

groundwater, Sept. 13 Software reviews Maple, July 69 Mathcad, July 70 Mathematica, July 70 Matlab, July 72

TK Solver, July 72 Soil pollution prevention predicted by method, June 20

Soil remediation citric acid cleans polluted soil, Feb. 16

steam used to destroy contaminants in situ, Jan. 12

Solar pans, design of, July 65 Solvents

industrial cleaning, center established for study of, Feb. 18

organic, may be replaced by near-critical water, Dec. 18 Solvents, screening of for organic solids

cooling crystallization, Dec. 50 Hansen solubility parameters, Dec. 47 UNIFAC model for calculating activity coefficients, Dec. 46

Sound waves inspect fouling of membrane used to purify drinking water, Dec. 21 Space program, contributions to by chemical engineers, Apr. S6

Spreadsheets can facilitate use of safety fault trees for plants, Apr. 69

Stainless steels for combating corrosion in wastewater treatment plants, July 59

superaustenitic, for combating chlorides and nonoxidizing acids, Apr. 63 Standard Industrial Classification System

replaced by North American Industrial Classification System, Feb. 74

soil cleansed by, Jan. 12 soil contaminants, in situ, destroyed by, Jan. 12 Steam tables

formulation for general and scientific use, Nov. 46 formulation for industrial use, Nov. 46

improved methods for calculating, Nov. 45 Steam tables for formulating thermodynamic properties of water now in use may be outdated, warns National Institute of Standards and Technology, May 1 Sterilization, cold, for purifying liquid food,

Stormwater regulations expanded by EPA. Dec. 25

Oct. 17

Student Conferences Annual, Miami Beach, program highlights, Jan. S1 Dallas, preview of, Sept. \$5

Regional, summaries of, Sept. S7 Sulfar

and hydrogen recovered by MISHA process, Jan. 16

levels of in gasoline may be reduced by EPA, Aug. 20

Superconductors, magnetic-field patterns found at point current is carried without resistance, Jan. 14

Superfund, reform of uncertain this year. Sept. 19

Supply chain analysis to cut expenses for materials and services. Dec. 67 Surveys on

academics, young, find their careers satisfying, Jan. 9 chemical engineering's future

career management, Oct. 105 computer-related developments, Oct. 102. Oct. S3 corporate practices, Oct. 105

disruptive technologies, Oct. 111 economic forces. Oct. 104 education, Oct. 110 environmental factors, Oct. 103, Oct. S3 information technology, Oct. S3 medicine, Oct. \$4 other factors affecting, Oct. \$2 questionnaire, Apr. 104 safety, Oct. \$3 technological developments, Oct. 107 working life, Oct. S2

grads face welcoming job market, June 13

overseas assignments, ChEs recommend them, Dec. 13 Sustainable development

climate change will dominate, Jan. 61 and global economics, Jan. 58 Synthesis gas, natural gas converted to by ceramic membranes, Oct. 11

equipment

Tanks, agitated slurry, design of, Nov. 51 Teamwork, teaching of through interdisci-plinary projects, Feb. S1 Testimony, expert, of engineers, standards clar-

ified by Supreme Court, May 19 Thank-you letters, tips on writing, Jan. S14

Thermal Data for Natural and Synthetic Fuels, book review, Dec. 81 Thermal desorption

heated screws, Oct. 50 rotary dryer, Oct. 50 thermal blankets, Oct. 50 risks to workers from, Oct. 55

for site remediation, basics of, Oct. 49 system costs, Oct. 53 Thermodynamic models used in phase equilib-

rium calculations for an electrolyte system, Oct. 27 Thiokol sued by Alliant Techsystems for patent infringement of asbestos-free insulation.

Time Out: Using Visible Pull Systems to Drive Process Improvement, book review, Apr. 75

Tires recycled into activated carbon adsorbents,

Tissue engineering, role of engineers in, Apr. S1

Title V air operating permit, negotiation of, July 51 TK Solver mathematics software.

July 72 Topics in Environmental and Safety Aspects of Combustion Technology, book review,

Aug. 93 Toxicological profiles of priority hazardous substances updated, Nov. 15

Two-phase flows during releases, determination of, Feb. 55

UV

Ultra-Fine Particles: Exploratory Science and Technology, book review, Mar. 76 United States, nuclear power plants can sue for government's failure to accept spent fuel,

Valves

control, sizing and selection of, Mar. 45 directional and shielded, for distillation trays,

Jan. 30 safety, two-phase flows through, Feb. 55

Vegetable oil turned into biodiesel fuel by catalytic process, Apr. 17

Vessels, jacketed agitators for, June 63 heating/cooling jackets and internal coils, June 62

materials of construction and surface finishes, June 61 specification of, June 67

thermal design of heat-transfer coefficient, June 64 heat transfer inside jackets and coils, June 64

heat transfer on tube outer surface. June 66 heat transfer on vessel inner surface, June 65

vessel temperature vs. time, June 66 Visual Explanations: Images and Quantities, Evidence and Narrative, book review, Oct. 79

VOC Bioheater mitigates fire and explosion hazards in wastewater systems, Aug. 58 VOC emissions reduced by zeolites, June 51 Washington Internships for Students of Engineering program, summaries of posi-

tion papers written by interns, Jan. S6

Wastewater cleanup, ceramic membranes for, Oct. 14

Wastewater, discharges from centralized waste treatment facilities, regulation on pro-posed by EPA, Mar. 24

Wastewater systems prevention, mitigation, and control of process hazards in, Aug. 53

VOC Bioheater mitigates fire and explosion hazards, Aug. 58 Wastewater treatment

corrosion control in plants using stainless steels, July 59 fluid-bed incinerator problems, May 61,

May 62 heavy metals removed using pecan shells treated to become activated charcoal filters, Apr. 12

Water

biocide control in, Aug. 62 makeup and cooling, microbiological control in, Aug. 62

near-critical, may replace organic solvents, Dec. 18

steam tables in use for formulating thermodynamic properties of may be outdated, warns National Institute of Standards

and Technology, May 17 thermal desalination of, Sept. 43 Water Vapor Measurement: Methods and Instrumentation, book review. July 83

Water washing, high-pressure, of parts and equipment to prevent pollution. May 30

Weapons, biological and chemical, neutralized by foam, Apr. 10 Wet air oxidation, materials for, Mar. 51

What Went Wrong?: Case Histories of Process Plant Disasters, book review. Oct. 77

Why Things Are & Why Things Aren't. book review, Mar. S8 Wichterle, Otto, creator of contact lens, dies at

84, Apr. S5 Wound-care dressing of cellulose promotes healing, June 21

Wound-care products, May 13

YΖ

Yellow Book: Guide to Environmental Enforcement and Compliance at Federal Facilities reissued by EPA,

Y2K problem

chemical process industries are prepared for, Nov. 25

testing policy published by EPA to ensure environmental compliance is not impaired, May 20

Zeolites

catalyst for "greening" of process technology, June 52 NO₄, atmospheric, reduced by, June 50 properties of, June 47 VOC emissions reduced by, June 51

Author Index

Agarwal, D. C., Jan. 62 Alatiqi, I., Sept. 43 Alexander, G. C., Jan. 41 Allen, C., Nov. 75 Andia, D., Mar. 100 Ayers, J. B., Feb. 31

Basu, P. K., Aug. 82, Mar. 39 Beck, C., Sept. 87 Beck, C. B., Apr. 73, Dec. 80 Berger, S. A., Apr. 53 Bisio, A., May 72 Boehm, P. D., June 69 Bokis, C. P., Apr. 39 Bond, G. G., Sept. 84 Boylan, J. P., May 35 Bravo, J. L., Mar. 25

Carroll, J. J., Jan. 49
Carroll, R. C., Feb. 71
Chaput, Jr., A. B., Apr. 57
Chen, C. C., Apr. 39
Christian, J. B., Dec. 79, Oct. 79
Clark D. G., July 75
Cohen, A. J., May 59
Colannino, J., Nov. 92
Cornier, W. E., June 47
Cortés, U., June 39
Cartis, R. L., Dec. 37

Daly, G., Nov. 33 Dangtran, K., May 59 de Jong, J. A. H., Apr. 25 DeCicco, J. D., July 69 DeJmek, K. A., Nov. 85 DeMichael, D. B., Nov. 57 Deshpande, P. B., Sept. 65 Donahue, D. W., Feb. S1 Downey, J. R., Dec. 41 Dyer, J. A., May 24, May 30

Eastman, Jr., P. T., Apr. 35 Edwards, V. H., Aug. 53, July 75, Nov. 51, Sept. 55 E3-Dessouky, H. T., Sept. 43 Erbes, R. E., July 51 Ettouney, H. M., Sept. 43

Faassen, J., Apr. 73
Falcone, P., Jan. S14
Fauske, H. K., Feb. 55
Febo, Jr., H. L., Sept. 79
Feehan, E., Jan. 93
Fende, D. S., Apr. 63
Filer, S., Aug. 61
Finkers, J., Apr. 25
Fitzgerald, N., Feb. S4
Ford, K. A., May 39
Forde, P. T., May 98
Frank, T. C., Dec. 41
Frank, W. L., May 51
Frankie, B. M., Feb. 45

Garvin, J., June 61
Gelevan, W. D., Dec. 74
George, M. A., Oct. 77
Goldstein, M., Sept. 65
Goss, J. E., Jan. 67, July 82
Grossel, S. S., Aug. 93, Dec. 79, July 82,
Mar. 77, Oct. 77
Gupta, S. K., Dec. 41
Guthrie, J. E., Feb. 59

Harrington, K. H., Dec. 63 Harry, L. D., Aug. 35 Harvey, A. H., Nov. 45 Heggs, P. J., Dec. 27 Hellgardt, K., June 80 Heywood, N. I., Sept. 21 Hibner, E. L., Apr. 63 Hobbs, D. H., May 51 Hoffmann, A. C., Apr. 25 Horwitz, B. A., Oct. 69 Ionel, I., Dec. 81

Jaeger, N., June 25 Jeffers, S., May 59 Johnston, P. R., June 73 Jones, D. W., May 51

Kaan, S., Aug. 49 Kane, R. D., Mar. 51 Keller, R. A., May 24 Kenat, T. A., Feb. 39 Kennedy, M. M., Aug. 23 Kletz, T. A., Jan. 67 Knack, F. H., Mar. 73 Kumar, M. S., May 43 Kumar, P. S., May 43

Lafuente, J., June 39 Lamb S., July 59 Laroche, L. F., July 107 Lee, S.-Y., July 23 Lelea, D., July 83 Lester, E., Jan. S8 Lewis, Jr. T. H., June 55 Litzen, D. B., Mar. 25 Liu, Y.-V., Oct. 25 Lu, X.-V., Jan. 41

MacDougal, C. R., July 51 Mack, R. A., Aug. 82 Makker, S. L., Sept. 65 Mannan, S., May 73 Marcus, B. K., June 47 Martin, J., Nov. S6 Mascone, C. F., Apr. 104, Oct. 102 McCann, G. T., Feb. 67 McIntosh, III, J. A., Oct. 62 McKeage, K., Feb. S1 McPherson, T., Aug. 49 Meagher, J., Jan. S6 Meltzer, J. S., Aug. 35 Metzger, B. H., June 69 Miller, M. J., Apr. S1 Mukesh, D., Feb. 23 Mukherjee, R., Aug. 91, Mar. 76 Mulholland, K. L., May 24, May 30 Mullen, J. F., May 59 Myers, K. J., Nov. 33

Naik, N., Mar. 39 Neuman, C., Nov. 81 Noten, A. R., Mar. 39

Olsson, R. R., Oct. 57 Orbey H., Apr. 39 Overcash, M., May 73 Owens, D. A., Jan. S12

Pandit, A. B., May 43 Parry, W. T., Nov. 45 Patrick, R. K., Apr. 69 Peterson, R. R., Jan. 57 Phillips, J. E., July 69 Piccirilli, V., Aug. 35
Pietsch, W., Aug. 67, Jan. 68, June 81, Mar. 77, Nov. 92, Sept. 87
Pizzarello, C., Aug. 35
Poch, M., June 39
Polley, P. T., Dec. 27
Porcelli, J. V., Feb. 80
Posteraro, K., Oct. 43
Purcell, M. K., Mar. 45

Raney, G., Nov. 85 Read, C., Dec. 67 Reeder, M. F., Nov. 33 Reichard H., June 80 Reichard, H., Sept. 88 Ricks, B., Nov. 51 Robinette, M. B., Jan. 41 Roda Layret, I. R., June 39 Rose, S. E., Dec. 63 Russell, D. L., Feb. 71 Ryan, D., Nov. 33

Sanchez-Marrè, M., June 39 Schacter, R., Mar. S1 Schillmofler, C. M., Feb. 81, May 65 Schneider, D., Aug. 92 Scott, C. D., Apr. 75 Senecal, J. A., Aug. 35 Seymour, R. M., Feb. S1 Siegell, J. H., Dec. 74 Sinclair, G., Aug. 43, Feb. 27 Singh, R., Mar. 59, Sept. 57 Siwek R., June 25 Sloley, A. W., Jan. 23, Mar. 73, Nov. 91 Slonski, S. J., Aug. 35 Spong, Jr., R. E., May 51 Stamm, K., Jan. S9 Steinmeyer, D., Mar. 73 Sullivan, T. P., Oct. 49 Summers, A. E., May 39, Nov. 85 Swedan, N. H., July 65

Taylor, S. T., Oct. 62 Tembrock, J., Sept. 57 Thesen, S. B., Mar. 33 Thorman, J. M., Jan. 41 Tillack, D. J., Feb. 59 Tsui, Y. P., July 23 Tuthill, A. H., July 59

Vinson, J. M., Aug. 82 von Essen, J. A., Nov. 51

Wallace, S. J., Mar. 71 Watanasiri, S., Oct. 25 Wedlich, R. C., Sept. 71 Wiczorek, G. M., Mar. 39 Worstell, J. H., Apr. 75, Jan. 67, July 82, June 81, Nov. 91, Sept. 90

Yin, J., Nov. 65

Zentner, M. G., Aug. 43 Zubrin, R., Feb. 45

